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W. W. SMITH

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APPLIANCE FOR INTERNAL COMBUSTION ENGINES

Filed Nov. 2, 1923

FIG. 1.

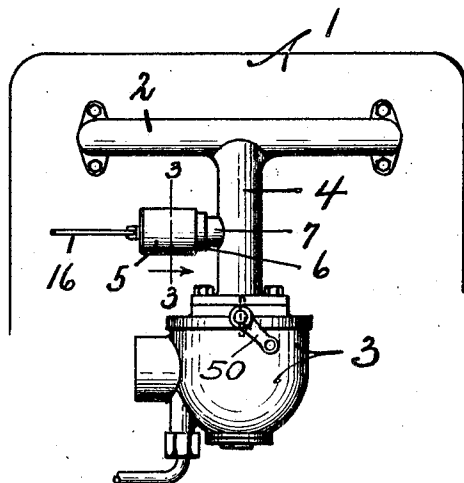


FIG. 2.

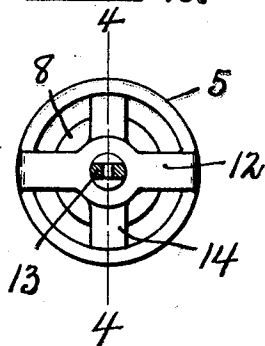


FIG. 3.

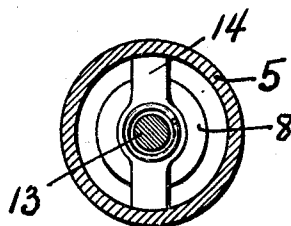
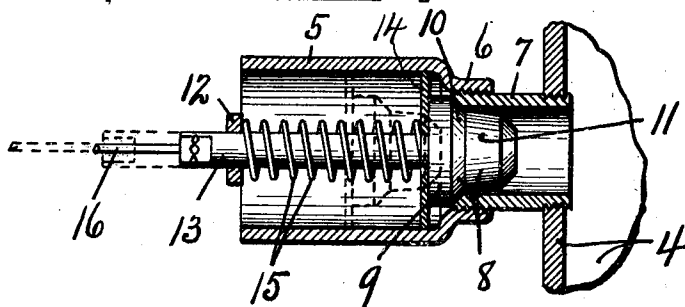


FIG. 4.



INVENTOR
Wallace W. Smith
BY *Deuson Simpson*
ATTORNEY

UNITED STATES PATENT OFFICE

WALLACE W. SMITH, OF CAMDEN, NEW YORK

APPLIANCE FOR INTERNAL-COMBUSTION ENGINES

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This invention relates to certain improvements in appliances for internal combustion engines, and more specifically I term the appliance an air brake for automobiles embodying an internal combustion engine, altho the appliance has advantages in addition to its air braking function.

As before suggested, the primary object of the invention is the production of an air brake for an automobile thereby conserving the usual service brakes, and in this embodiment the braking function is effected by providing an auxiliary source of air supply under control of the operator that can at desired times be admitted to the manifold and the cylinders of the internal combustion engine to provide a non-combustible gas that must be compressed within the cylinders on the compression stroke of the pistons to thereby automatically slow down the operation of the engine, and the slowing down of the engine will react through the driving connections and wheels to retard the movement of the automobile.

The device has the further advantage of saving gas in engine operation by permitting the introduction of a regulated quantity of air under the control of the operator to produce the most desirable combustible mixture, and further acts to eliminate carbon difficulties in connection with the pistons and spark plugs largely resultant from the sucking of oil into the engine cylinders from the crank case when the usual butterfly valve between the carburetor and manifold is practically closed, and considerable vacuum is produced in the cylinders.

Other objects and advantages relate to the details of construction of the appliance, all as will more fully appear from the following description taken in connection with the accompanying drawings, in which:—

Figure 1 is an elevation of the appliance applied to an internal combustion engine.

Figure 2 is an end elevation of the appliance.

Figure 3 is a section on line 3—3, Figure 1.

Figure 4 is a section on 4—4, Figure 2.

In Figure 1 I have diagrammatically illustrated an internal combustion engine —1—

which is of the usual construction, and for the purpose of the air-braking function of my invention, is designed to be incorporated in an automobile with suitable driving connections to the wheels as ordinarily practiced, and generally known, and not herein necessary to further illustrate or describe.

—2— identifies the usual manifold of such an engine and —3— the carburetor. —4— is the pipe leading from the carburetor to the manifold.

Altho my appliance may be inserted in the engine structure in various positions to supply air to the manifold it should be positioned at some point beyond the carburetor and as here illustrated, is secured to and penetrates the conduit —4—.

In the construction here shown, the appliance comprises a cylinder —5— contracted at its forward end to produce a reduced portion —6— that is internally threaded for cooperation with an externally threaded cylindrical section —7— that in turn is threaded into the pipe or conduit —4— for securing the device in position.

The inner end of the cylindrical section —7— is preferably tapered or of somewhat conical form and ground to produce an accurate valve seat for cooperating with a valve —8— which may be of various forms, but is perhaps preferably of the form shown, consisting of a base —9— of a diameter slightly less than the internal diameter of the contracted portion —6— and having a somewhat conical valve portion —10— ground and mating with the base of the cylinder —7— to form a tight joint. Rising from the conical portion —10— is a somewhat tapered head or cap —11— which in connection with the valve portion —10— regulates the quantity of air admitted to the pipe —4— and manifold —2— in proportion to the extent of retraction or withdrawal of the valve part —10— from engagement with the base of the cylinder —7—.

For the purpose of holding the valve —8— in accurate alignment, the cylinder —5— is formed at its outer end with a cross wall —12— having an opening within which the outer end of the valve stem —13— is mounted

or journaled to permit sliding of the valve stem, but to eliminate lateral movement. In addition, the valve stem —13— which is rigidly connected to valve —8— is further mounted in a cross bar —14—, which bar is slidable within the cylinder —5— and preferably tightly engages the inner surface of the walls of the cylinder, and is normally in contact with the base —9— of the valve, and is held in that position and reacts to hold the valve —8— in closed position by reason of spring —15— confined between the cross bar —12— at the end of the cylinder and the slidable cross bar —14— within the cylinder.

For operating the valve stem —13— and moving it endwise to open the valve —8— any suitable apparatus or mechanism may be provided such as wire —16— leading to any desired position for operation by hand or by a foot pedal or otherwise as desired.

The operation of the structure will be understood. When the butterfly valve, which is positioned between the device of this invention and the carburetor, and the operating lever for which is here illustrated at —50— is substantially closed, as for instance when the automobile is moving down hill, the engine may be shut off, and under such conditions ordinarily the operation of the pistons tend to suck combustible mixture into the cylinders which is completely wasted, but due to the fact that the butterfly valve is practically closed, a comparatively small quantity of such mixture is fed to the cylinders, and that is not sufficient to retard the operation of the pistons by reason of the necessity of compressing the charge in the cylinders.

However, by pulling out the valve stem —13— and thereby unseating the valve —8— sufficient air can be admitted to the manifold and to the cylinders to constitute a capacity charge which upon the return stroke of the piston is necessarily compressed and retards the action of the pistons, and thereby acts as a brake upon the operation of the engine and the automobile of which it forms a part.

Further, by opening valve —8— and permitting free entrance of air to the manifold and the cylinders there is not sufficient suction produced beyond the butterfly valve to draw in any further gasoline and fuel is thereby conserved in addition to the elimination of the necessity of using service brakes.

Further, when vacuum is produced in the cylinders which is not satisfied by the admission of combustible mixture from the carburetor as when the butterfly valve is substantially closed, oil is sucked into the cylinders from the crank case and fouls the piston and the spark plugs and results in the production of considerable carbon, which operation is entirely eliminated by the use of my appliance because the vacuum in the cylinders is satisfied by the free admission of air thru the appliance.

In addition the appliance may be utilized to increase the efficiency of engine operation by opening the valve slightly, the tapered portion —8— acting to restrict the entrance of air during the preliminary opening of the valve so that a most efficient mixture may be provided by the admission of air additional to that supplied through the carburetor inlet.

Altho I have shown a specific construction of device as illustrative of a perhaps preferred embodiment of my invention, I do not desire to restrict myself to the details of form, construction or arrangement of the appliance, or the parts thereof, as various changes may be made within the scope of the appended claims.

I claim:

1. In an appliance of the class described, a cylindrical part having an imperforate body open at both ends, reduced and threaded at one end and having a perforated cross bar at the other end, a cylindrical section threaded into the reduced threaded portion of said part, said section formed with a valve seat, a valve having a stem movable within the cylindrical part into and out of contact with said seat, a slidable and rotatable guide bar for maintaining said valve in alignment with said seat, said guide bar being rotatable relatively to the valve stem, and spring means acting on said guide bar to hold said valve in contact with said seat.

2. In an appliance of the class described, a cylindrical part having an imperforate body open at both ends threaded at one end and formed with a perforated guiding means at its opposite end, a cylindrical section having a threaded engagement with the threaded end of said cylindrical part, said section formed with a valve seat, a valve movable into and out of contact with said seat, a valve stem secured to the valve and extending through the perforation in said guide, a slidable and rotatable guide-bar within said cylindrical part, said guide bar being also rotatable relatively to the valve stem, and spring means for maintaining said slidable bar in contact with the valve.

In witness whereof I have hereunto set my hand this 20th day of October, 1923.

WALLACE W. SMITH.